tered during a certain year —. I tried to reduce the difference o – M (Table II.) by applying to M a constant correction, $10x$, and at the same time a correction ry proportional to the respective relative number. The equations of condition of the form—

$$10x + ry + o - M = o$$

are exhibited in Table I., the last column of which exhibits the remaining errors, v, *i.e.* the difference between the registered rainfall, o, and the calculated, $C = M - 10x - yr$, after that the quantities x and y had been obtained from the equations of condition by solving them by aid of the method of least squares. It will be remarked that v is far smaller than o – M in Table I., the average of several years, but the comparison from year to year, o—C as exhibited in Table II., shows but a small decrease in the differences. The result is—

$$C = \underset{\text{inches.}}{34\cdot435} + 0\cdot04785\,r = \underset{\text{inches.}}{37\cdot254} + 0\cdot04785\,(r - 58\cdot91).$$

TABLE I.

Years: 1800 +	Equations of condition.	v.
56, 55, 33	$10x + 7\cdot4y - 3\cdot35 = 0$	−0·89
43, 34, 44	$10x + 15\cdot2y - 1\cdot89 = 0$	+0·20
54, 57, 42	$10x + 22\cdot3y - 2\cdot87 = 0$	−1·12
45, 41, 53	$10x + 38\cdot4y - 0\cdot23 = 0$	+0·76
63, 52, 58, 35	$10x + 53\cdot3y + 0\cdot84 = 0$	+1·11
46, 62, 40	$10x + 60\cdot8y - 1\cdot07 = 0$	−1·16
51, 50, 61	$10x + 70\cdot2y + 4\cdot04 = 0$	+3·50
39, 59, 60	$10x + 89\cdot5y + 2\cdot52 = 0$	+1·06
49, 47, 38	$10x + 99\cdot0y - 1\cdot99 = 0$	−3·91
36, 48, 37	$10x + 127\cdot0y + 3\cdot71 = 0$	+0·45

TABLE II.

Year.	r.	o. inches.	o–M. inches.	o–C. inches.
1833	9·4	44·49	+7·24	+9·60
1834	13·3	36·50	−0·75	+1·42
1835	59·0	37·34	+0·09	+0·08
1836	119·3	41·39	+4·14	+1·25
1837	136·9	40·29	+3·04	−0·70
1838	104·1	31·00	−6·25	−8·41
1839	83·4	33·92	−3·33	−4·50
1840	61·8	30·77	−6·48	−6·63
1841	38·5	35·55	−1·70	−0·73
1842	23·0	33·25	−4·00	−2·30
1843	13·1	35·96	−1·29	+0·89
1844	19·3	33·63	−3·62	−1·73
1845	38·3	40·37	+3·12	+4·10
1846	59·6	37·56	+0·31	+0·28
1847	97·4	37·17	−0·08	−1·92
1848	124·9	41·22	+3·97	+0·81
1849	95·4	37·63	+0·38	−1·37
1850	69·8	37·12	−0·13	−0·65
1851	63·2	40·25	+3·00	+2·79
1852	52·7	45·72	+8·47	+8·75
1853	38·5	35·17	−2·08	−1·11
1854	21·0	34·77	−2·48	−0·67
1855	7·7	29·36	−7·89	−5·44
1856	5·1	27·87	−9·38	−6·81
1857	22·9	35·14	−2·11	−0·40
1858	56·2	34·34	−2·91	−2·79
1859	90·3	41·65	+4·40	+2·90
1860	94·8	43·74	+6·49	+4·77
1861	77·7	46·52	+9·27	+8·36
1862	61·0	40·23	+2·98	+2·88
1863	45·4	34·97	−2·28	−1·64

It should be remarked that the receiver of the guage is placed on the top of the library, 16 feet above the ground and 148 feet above mean sea-level. I have placed another guage 6 inches above the ground and 110 feet above the sea, as levelled from bench-mark on observatory wall, and have taken precautions against evaporation from this guage. By comparing the results from the two guages during the last five years, I find that the rainfall registered by aid of the upper guage must be multiplied by 1·2426 in order to indicate the rainfall at 110 feet above sea. The formula properly reduced is therefore—

$$C = \underset{\text{inches.}}{46\cdot292} + 0\cdot05946\,(r - \underset{\text{inches.}}{58\cdot91}).$$

I am only too painfully conscious that this result has been derived from insufficient data, but it might be interesting to see whether it would be confirmed by a similar discussion of a sufficiently extensive register kept at some older observatory.

The average monthly rainfalls are as follows:—

	inches.		inches.
January ...	3·451	July ...	3·284
February ...	2·771	August ...	3·599
March ...	2·485	September ...	3·249
April ...	2·460	October ...	3·881
May ...	2·026	November ...	3·530
June ...	3·044	December ...	3·474

Markree Observatory, July 17 W. DOBERCK

THE NEW REPTILE HOUSE AT THE ZOOLOGICAL SOCIETY'S GARDENS

THE present Reptile House in the Zoological Society's Gardens adjoining the Lecture Room, is an old wooden building, which in the early days of the Society was used for lions and tigers, and is now in a very bad state of repair. Besides this it is much too small for the present collection of reptiles. The cages which it contains are always over full, while the tortoises are necessarily lodged in a separate house, and the crocodiles are kept in a building properly destined to contain sloths and marsupials. Moreover, most of the compartments in the present Reptile House are accessible only from the front, which renders it inconvenient, not to say dangerous, to open them in the day-time, when the house is filled with sightseers. Under these circumstances, the Council of the Society have determined to construct an entirely new building for the better accommodation of the reptiles at the southern corner of the Gardens, and having obtained the necessary permission of H.M. First Commissioner of Works, will commence operations immediately.

The new Reptile House will be 120 feet long by 60 feet in breadth, with a large porch and double entrance at the front, and keepers' and workers' rooms in the rear. The building will be of brick with corse-hill stone dressings, the roof of iron, slated on the north slope, and provided with ample skylights on the south slope. The house will face due south. It will be fitted with fixed cages for the reptiles on the north, east, and west, leaving the south side (which will be nearly entirely of glass), available for movable cases (such as are now in use in the Insect House), for the smaller and more delicate objects. There will be a large oval pond for crocodiles in the centre of the building, and two smaller circular ponds on each side of it for other aquatic reptiles. The fixed cages, which will be from thirty to forty in number, will be fronted with plate-glass, and the only means of access to them will be from the keeper's passage in the rear, so that there will be no possibility of the animals escaping into the space occupied by the public.

The new Reptile House, will, it is expected, be completed and roofed in before Christmas, and as the hot-water apparatus will be finished by the same date, it will be possible to dry it thoroughly during the winter, so that the reptiles may be moved into their new quarters early in the ensuing summer.

The designs for the new building have been drawn by Mr. C. B. Trollope, and the contract for its erection has been undertaken by Messrs. Hannen and Holland.

The Society's collection of reptiles consists at present of 57 tortoises, 10 crocodiles, 95 lizards, and 83 snakes. Of the last-mentioned, 10 are large pythons and boas, and 14 belong to venomous species. Besides the reptiles there are 56 Batrachians living in the Gardens, which for the present at least, will be kept along with the reptiles.

There is, therefore, no fear of the new Reptile House lacking inhabitants, when ready to receive them next year.

DIFFICULT CASES OF MIMICRY

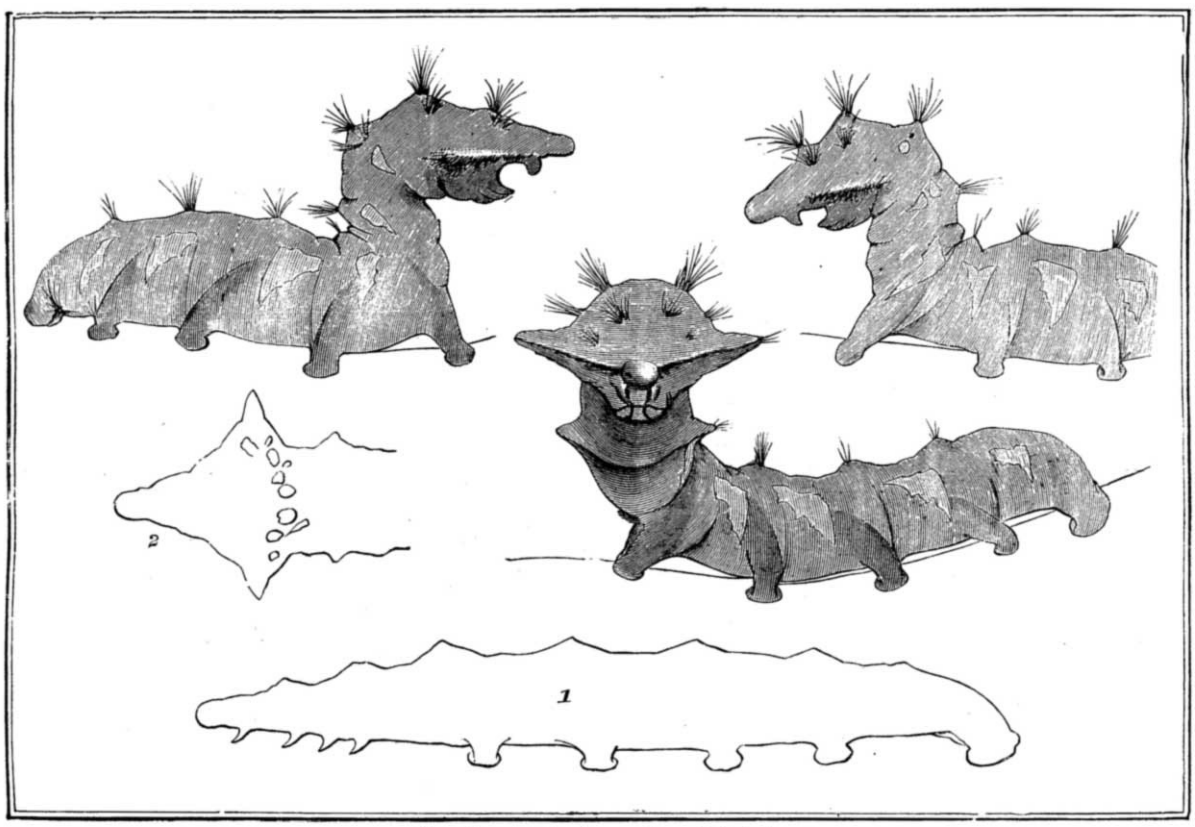
I SEE a notice regarding mimicry and simulation, by Mr. A. R. Wallace, in NATURE, vol. xxvi. p. 86, and beg to forward the case of a caterpillar mimicking a shrew, as a peculiar instance of this curious law.

Here we see the insect unconsciously simulating the very animal that most likely feeds on itself, or at least an insectivorous mammal. Passing through a dense forest near a path, I suddenly came on the caterpillar, at about five feet from the ground, on a stout creeper, and of course mistook it for a shrew. Its remaining, and not running off, induced me to look closer, when I saw the green markings, and at once secured the prize, and, after making a sketch or two, put it in my "hatching" cage; unfortunately, I could not find what it fed on, and after spinning a pale greenish cocoon, it died. The natives did not seem to know it. When moving along, it does so as other caterpillars, as seen in the outline 1, of which 2 is plan of the head. If suddenly disturbed, it at once strikes the peculiar pose, as seen in the sketches, and retains it for some time.

The general colour is a neutral to brown-grey, beautifully marked, and which I have not attempted to imitate; the general appearance is dark, except where the greenish-yellow spots occur. It is the first case I know where a caterpillar mimics a vertebrate animal. The cases are almost innumerable out here, where insects mimic each other and similar or different kinds, or leaves, seeds, flowers, sticks, pieces of grass or clay, &c., &c.; but we see it also in many other cases, not always protective, though invaluable to the animal or the insect. The tiger has one call, when hunting, so like the loud whistle of the Samber (deer) that only an expert and old resident can tell the difference. The deer, if within range, *run to it*, and I have myself shot a Samber at twenty yards that dashed up on my whistling loudly, with a leaf; unfortunately, native shikaries are only too expert at this. Again, the eye and nose lumps of a crocodile are so like lumps of foam that I have often drifted past close to one in my *Rob Roy*, and only found it out by the lump of foam quietly and suddenly *sinking* below the surface of the muddy water. In the case of the tiger the simulation was by sound, to enable it to get food; in that of the crocodile the same end is gained by simulation of appearance, enabling the animal to drift close to prey without alarming it.

S. E. PEAL

Asam, June 25



Caterpillar that simulates a Shrew (full size).

THE WASHBURN CHRONOGRAPH

THE article on the Brussels Chronograph (NATURE, vol. xxvi. p. 107) induces me to send a brief description of the chronograph of this observatory, which may be taken as representing the form usually adopted by the best American makers, Alvan Clark and Sons, Fauth and Co., Stackpole and Brothers, &c. The accompanying engraving gives a good general idea of it. The scale may be obtained by remembering that the iron base plate is 21½ inches by 11½ inches. The barrel is 14 inches long by 7 inches in diameter. The paper used is 23⅜ inches by 13 inches which provides for a lap at the line of junction. There is room for the observations of two hours and forty minutes. The weight employed is fifteen pounds, and usually a double pulley is used to diminish the fall.

The chronograph can be wound while it is going, with-